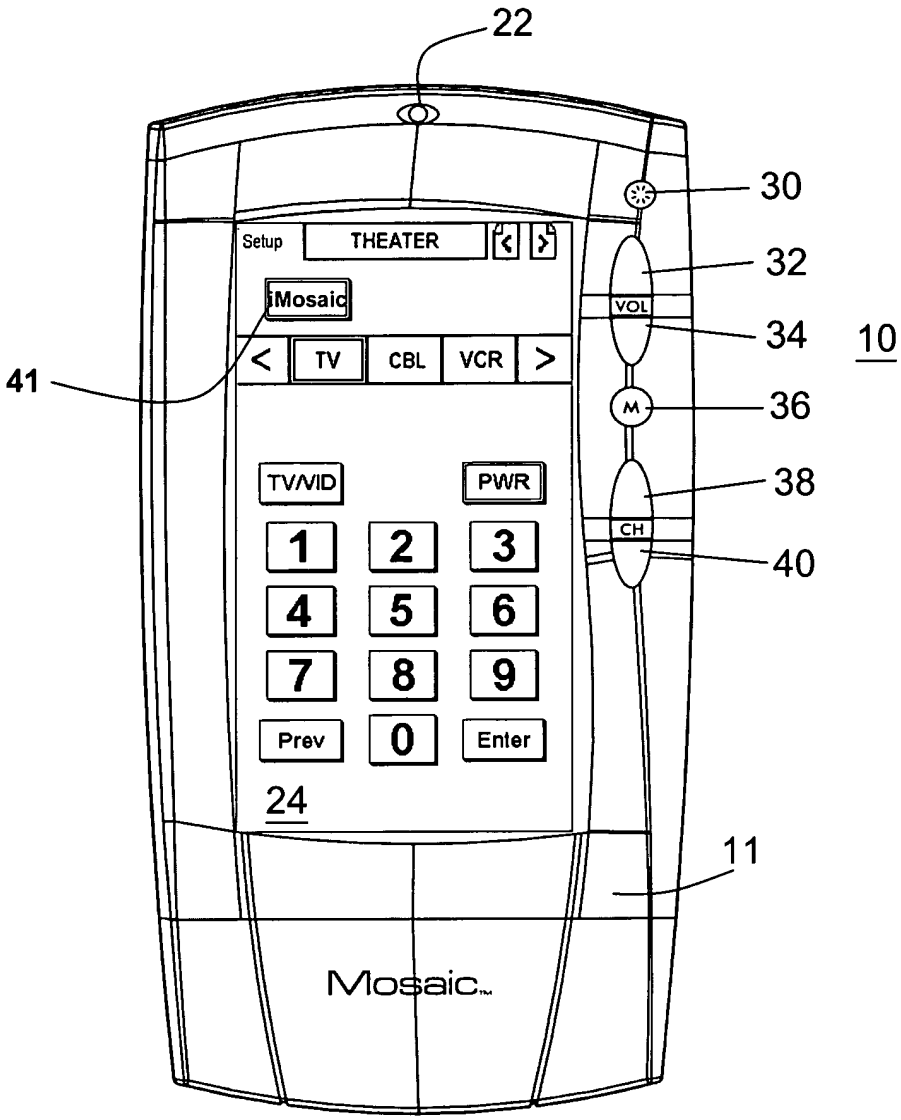

22
30
32
34
10
41
36
38
40
11
Setup
THEATER
iMosaic
VOL
TV
CBL
VCR
M
TV/VID
PWR
CH
1
2
3
4
5
6
7
8
9
Prev
0
Enter
24
Mosaic

Figure 1

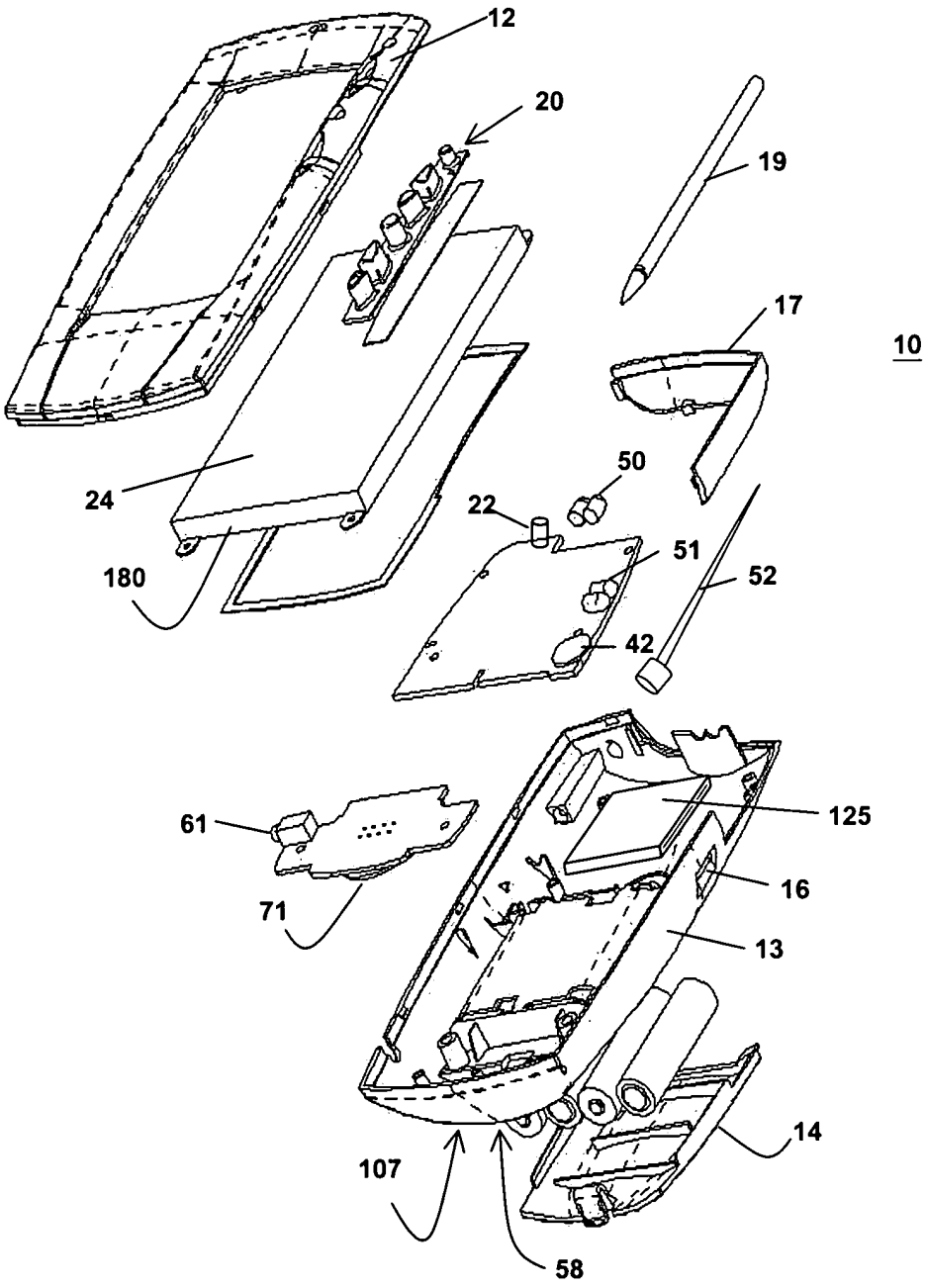


Figure 2

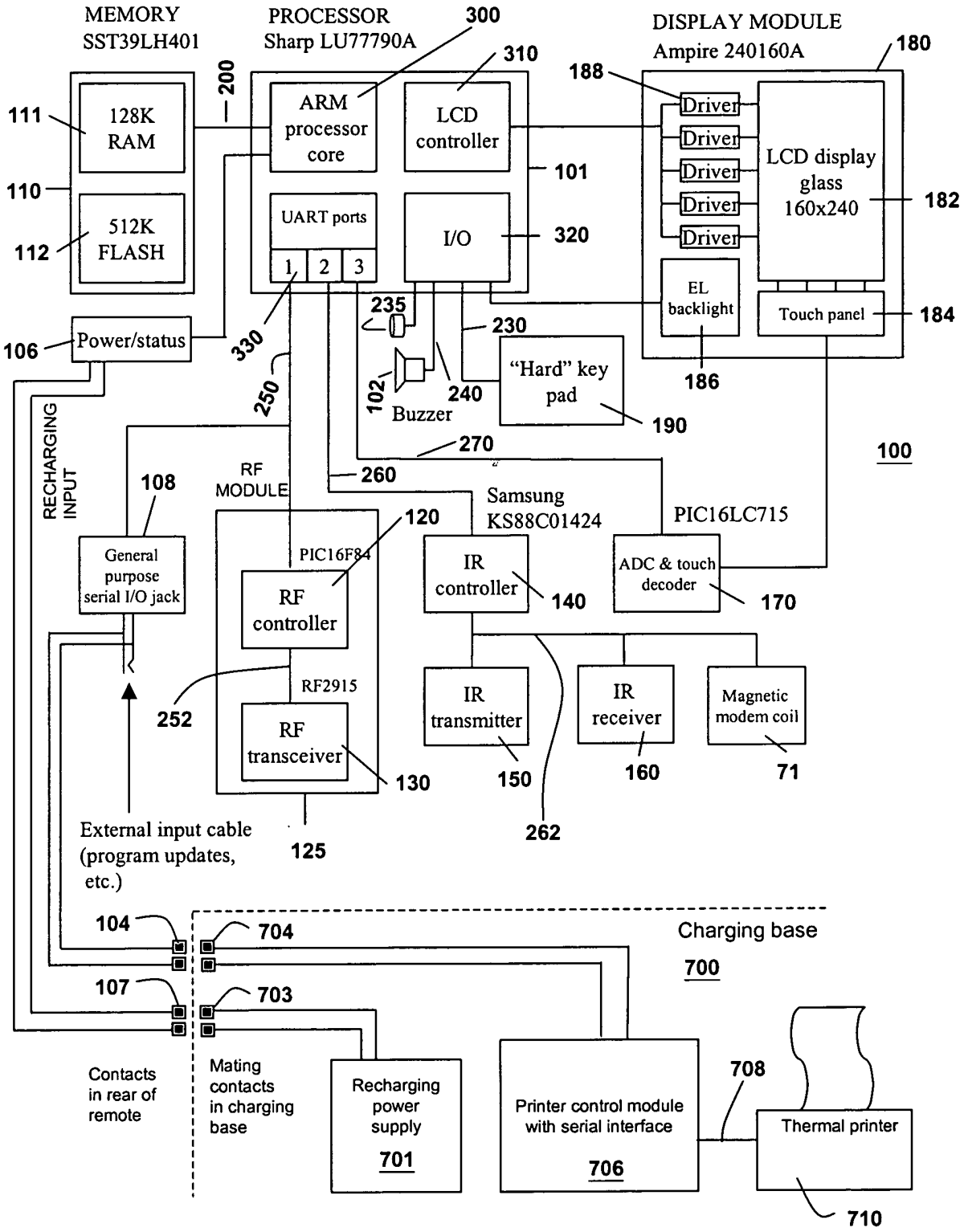

MEMORY
SST39LH401
PROCESSOR
Sharp LU77790A
300
DISPLAY MODULE
Ampire 240160A
180
200
111
128K RAM
110
512K FLASH
112
ARM processor core
310
LCD controller
101
188
Driver
Driver
Driver
Driver
Driver
LCD display glass 160x240
182
UART ports
1
2
3
I/O
320
EL backlight
Touch panel
184
186
235
230
106
Power/status
330
250
102
Buzzer
240
"Hard" key pad
190
270
100
RECHARGING INPUT
108
RF MODULE
260
Samsung KS88C01424
PIC16LC715
120
PIC16F84
General purpose serial I/O jack
RF controller
IR controller
140
ADC & touch decoder
170
RF2915
252
RF transceiver
130
IR transmitter
150
IR receiver
160
Magnetic modem coil
71
External input cable (program updates, etc.)
125
262
104
704
Charging base
700
107
703
Contacts in rear of remote
Mating contacts in charging base
Recharging power supply
701
Printer control module with serial interface
706
708
Thermal printer
710

Figure 3

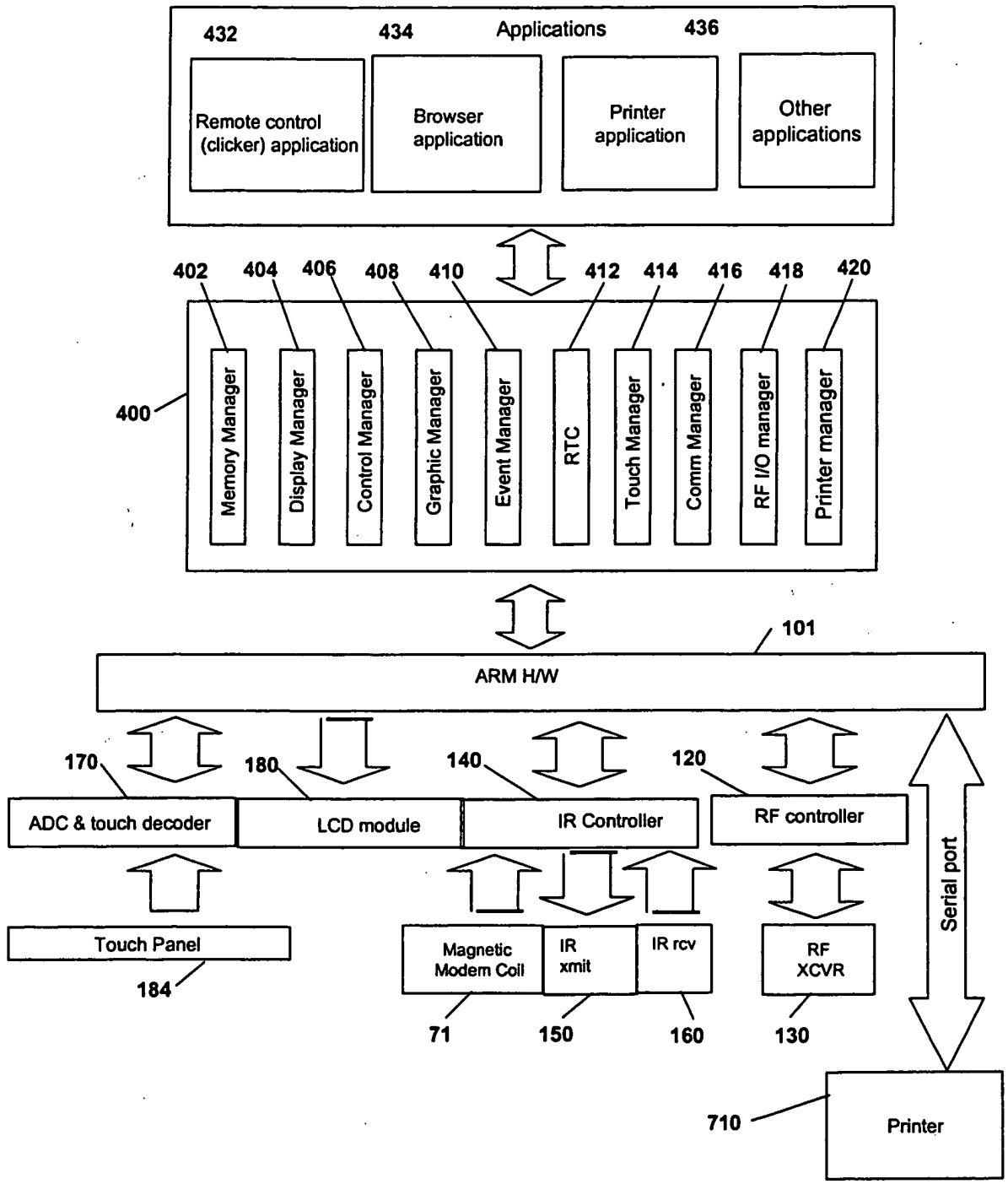

Applications
432
434
436
Remote control (clicker) application
Browser application
Printer application
Other applications
402
404
406
408
410
412
414
416
418
420
400
Memory Manager
Display Manager
Control Manager
Graphic Manager
Event Manager
RTC
Touch Manager
Comm Manager
RF I/O manager
Printer manager
101
ARM H/W
170
180
140
120
ADC & touch decoder
LCD module
IR Controller
RF controller
Serial port
Touch Panel
184
Magnetic Modem Coil
IR xmit
IR rcv
RF XCVR
71
150
160
130
710
Printer

Figure 4

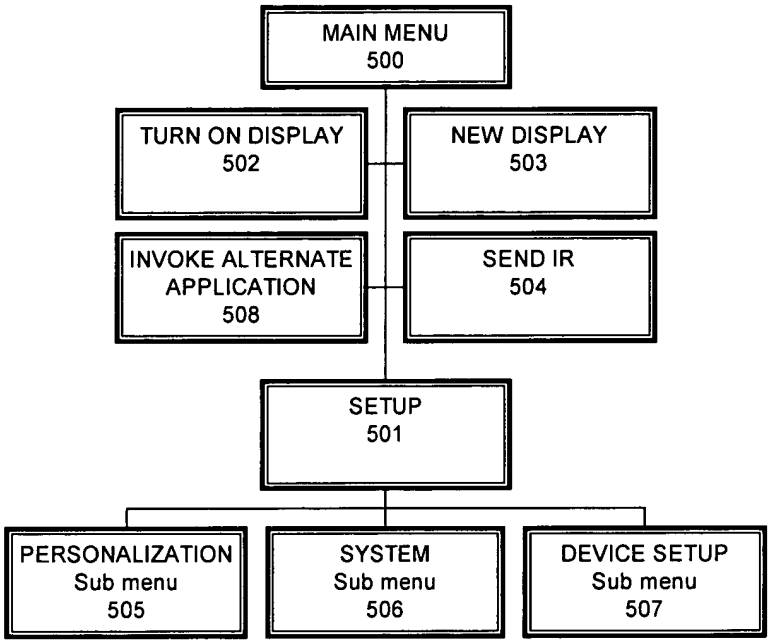

MAIN MENU
500
TURN ON DISPLAY
502
NEW DISPLAY
503
INVOKE ALTERNATE APPLICATION
508
SEND IR
504
SETUP
501
PERSONALIZATION
Sub menu
505
SYSTEM
Sub menu
506
DEVICE SETUP
Sub menu
507

Figure 5

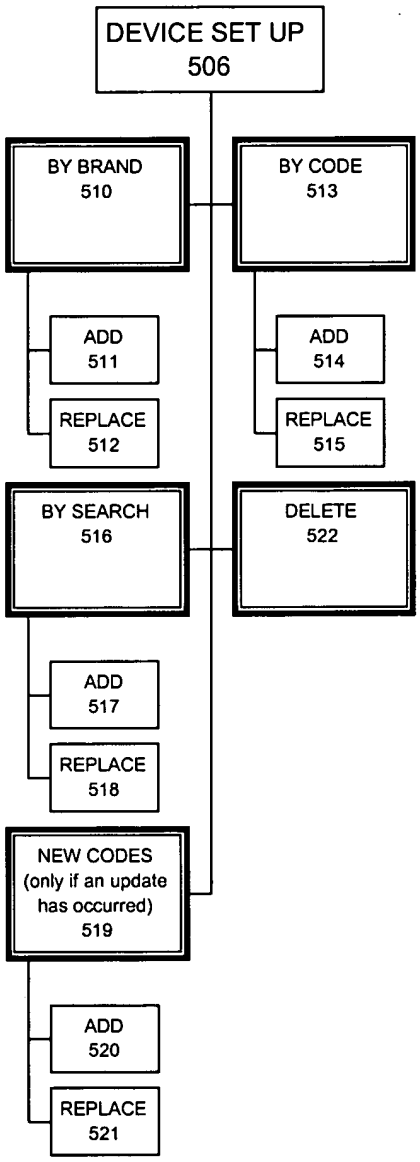

DEVICE SET UP
506
BY BRAND
510
BY CODE
513
ADD
511
REPLACE
512
ADD
514
REPLACE
515
BY SEARCH
516
DELETE
522
ADD
517
REPLACE
518
NEW CODES
(only if an update
has occurred)
519
ADD
520
REPLACE
521

Figure 6

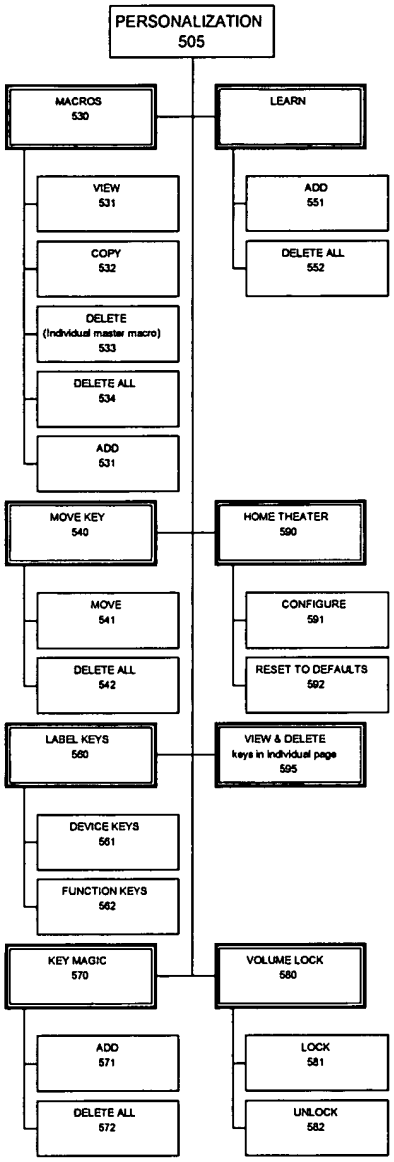

PERSONALIZATION
505
MACROS
530
LEARN
VIEW
531
COPY
532
DELETE
(Individual master macro)
533
DELETE ALL
534
ADD
531
ADD
551
DELETE ALL
552
MOVE KEY
540
HOME THEATER
590
MOVE
541
DELETE ALL
542
CONFIGURE
591
RESET TO DEFAULTS
592
LABEL KEYS
560
VIEW & DELETE
keys in individual page
595
DEVICE KEYS
561
FUNCTION KEYS
562
KEY MAGIC
570
VOLUME LOCK
580
ADD
571
DELETE ALL
572
LOCK
581
UNLOCK
582

Figure 7

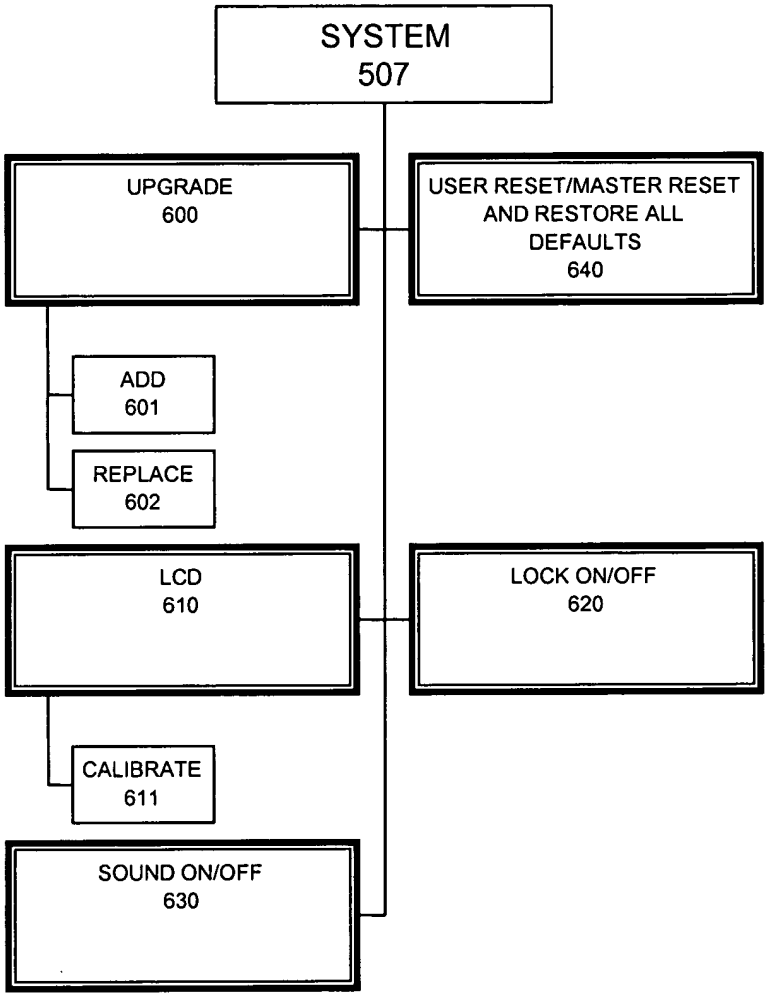

SYSTEM
507
UPGRADE
600
USER RESET/MASTER RESET AND RESTORE ALL DEFAULTS
640
ADD
601
REPLACE
602
LCD
610
LOCK ON/OFF
620
CALIBRATE
611
SOUND ON/OFF
630

Figure 8

Figure 9

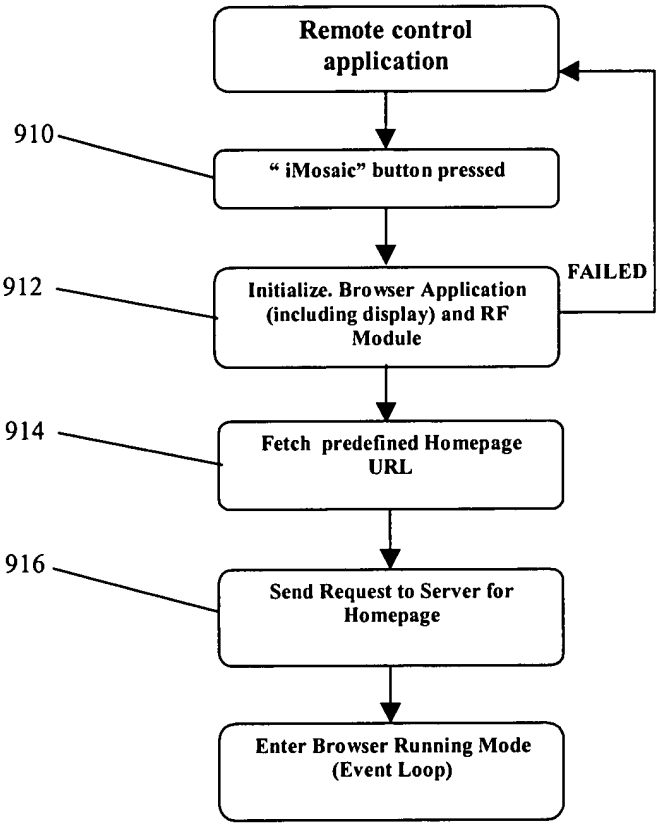

Remote control application
910
" iMosaic" button pressed
912
Initialize. Browser Application (including display) and RF Module
FAILED
914
Fetch predefined Homepage URL
916
Send Request to Server for Homepage
Enter Browser Running Mode (Event Loop)

FIGURE 10a

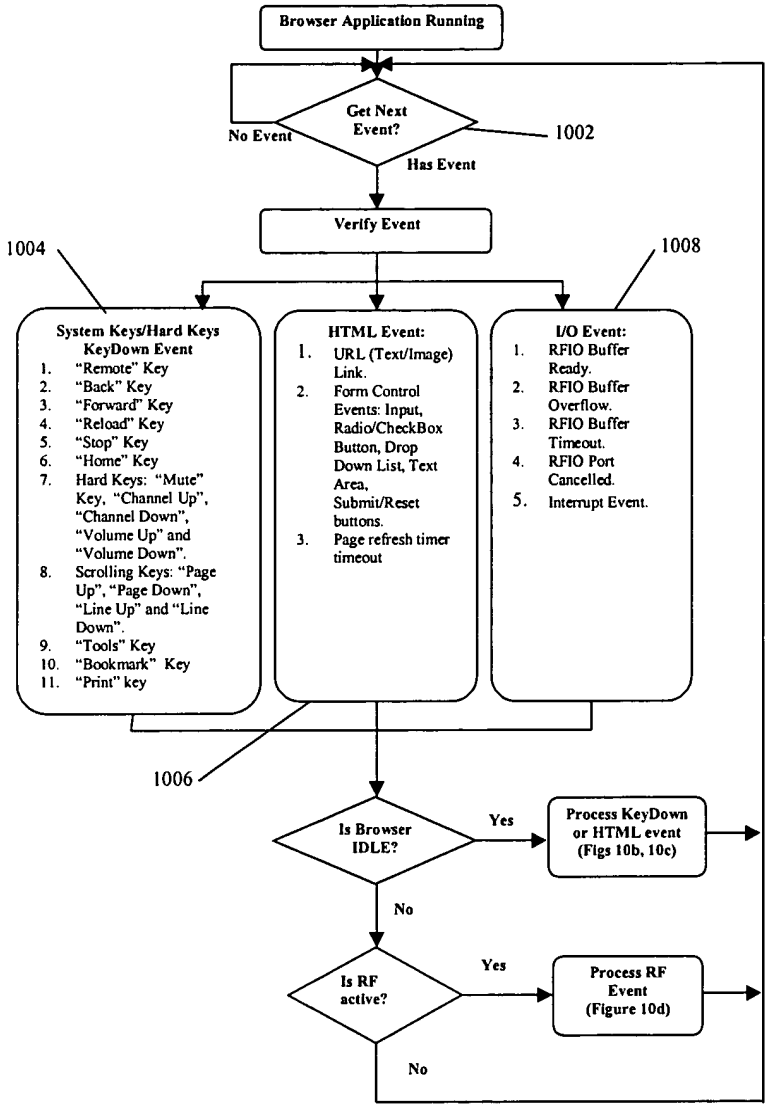

Browser Application Running
Get Next Event?
No Event
Has Event
1002
Verify Event
1004
1008
System Keys/Hard Keys KeyDown Event
1. "Remote" Key
2. "Back" Key
3. "Forward" Key
4. "Reload" Key
5. "Stop" Key
6. "Home" Key
7. Hard Keys: "Mute" Key, "Channel Up", "Channel Down", "Volume Up" and "Volume Down".
8. Scrolling Keys: "Page Up", "Page Down", "Line Up" and "Line Down".
9. "Tools" Key
10. "Bookmark" Key
11. "Print" key
HTML Event:
1. URL (Text/Image) Link.
2. Form Control Events: Input, Radio/CheckBox Button, Drop Down List, Text Area, Submit/Reset buttons.
3. Page refresh timer timeout
I/O Event:
1. RFIO Buffer Ready.
2. RFIO Buffer Overflow.
3. RFIO Buffer Timeout.
4. RFIO Port Cancelled.
5. Interrupt Event.
1006
Is Browser IDLE?
Yes
Process KeyDown or HTML event (Figs 10b, 10c)
No
Is RF active?
Yes
Process RF Event (Figure 10d)
No

Figure 10b

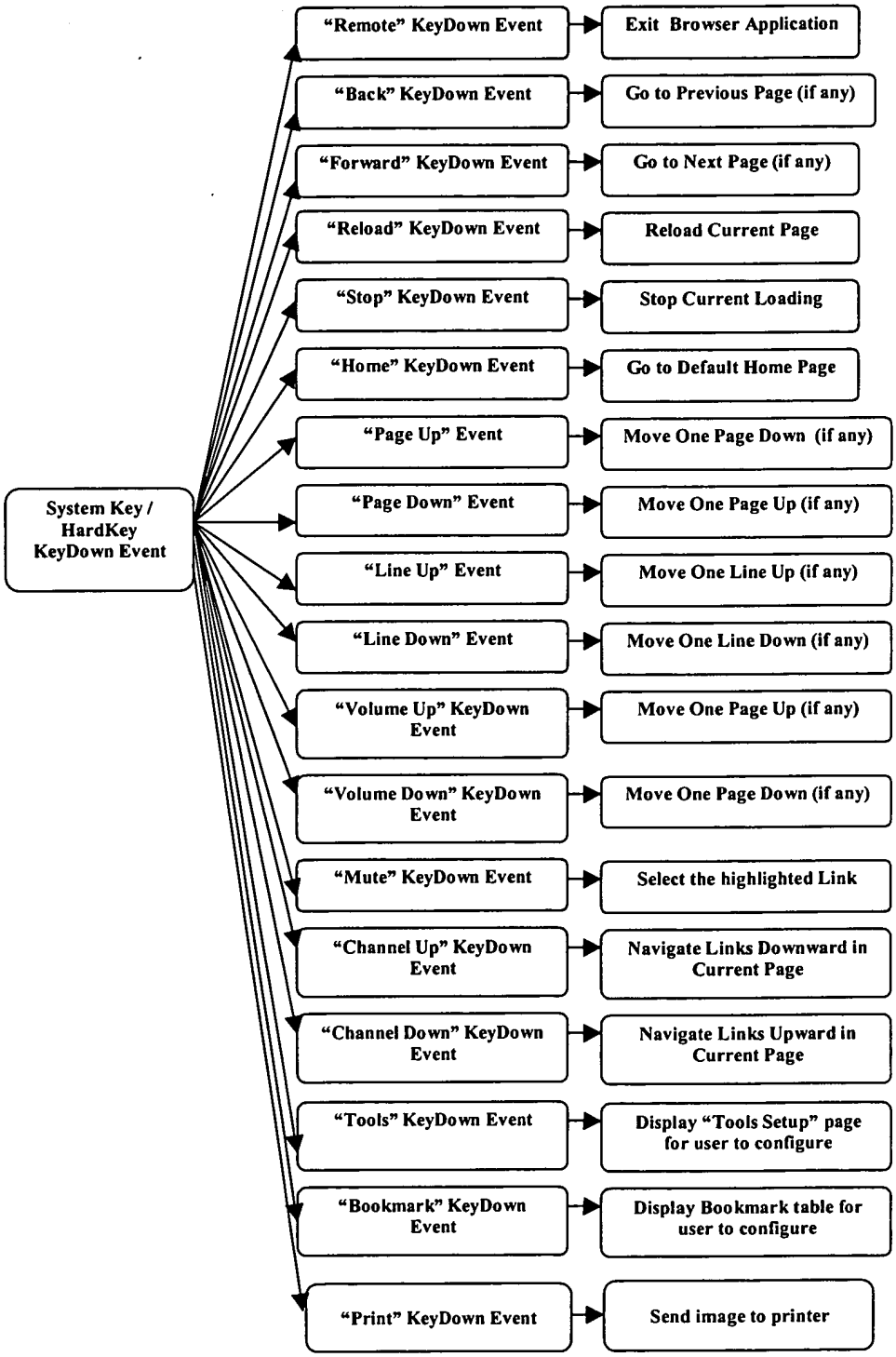

System Key / HardKey KeyDown Event
"Remote" KeyDown Event
Exit Browser Application
"Back" KeyDown Event
Go to Previous Page (if any)
"Forward" KeyDown Event
Go to Next Page (if any)
"Reload" KeyDown Event
Reload Current Page
"Stop" KeyDown Event
Stop Current Loading
"Home" KeyDown Event
Go to Default Home Page
"Page Up" Event
Move One Page Down (if any)
"Page Down" Event
Move One Page Up (if any)
"Line Up" Event
Move One Line Up (if any)
"Line Down" Event
Move One Line Down (if any)
"Volume Up" KeyDown Event
Move One Page Up (if any)
"Volume Down" KeyDown Event
Move One Page Down (if any)
"Mute" KeyDown Event
Select the highlighted Link
"Channel Up" KeyDown Event
Navigate Links Downward in Current Page
"Channel Down" KeyDown Event
Navigate Links Upward in Current Page
"Tools" KeyDown Event
Display "Tools Setup" page for user to configure
"Bookmark" KeyDown Event
Display Bookmark table for user to configure
"Print" KeyDown Event
Send image to printer

Figure 10c

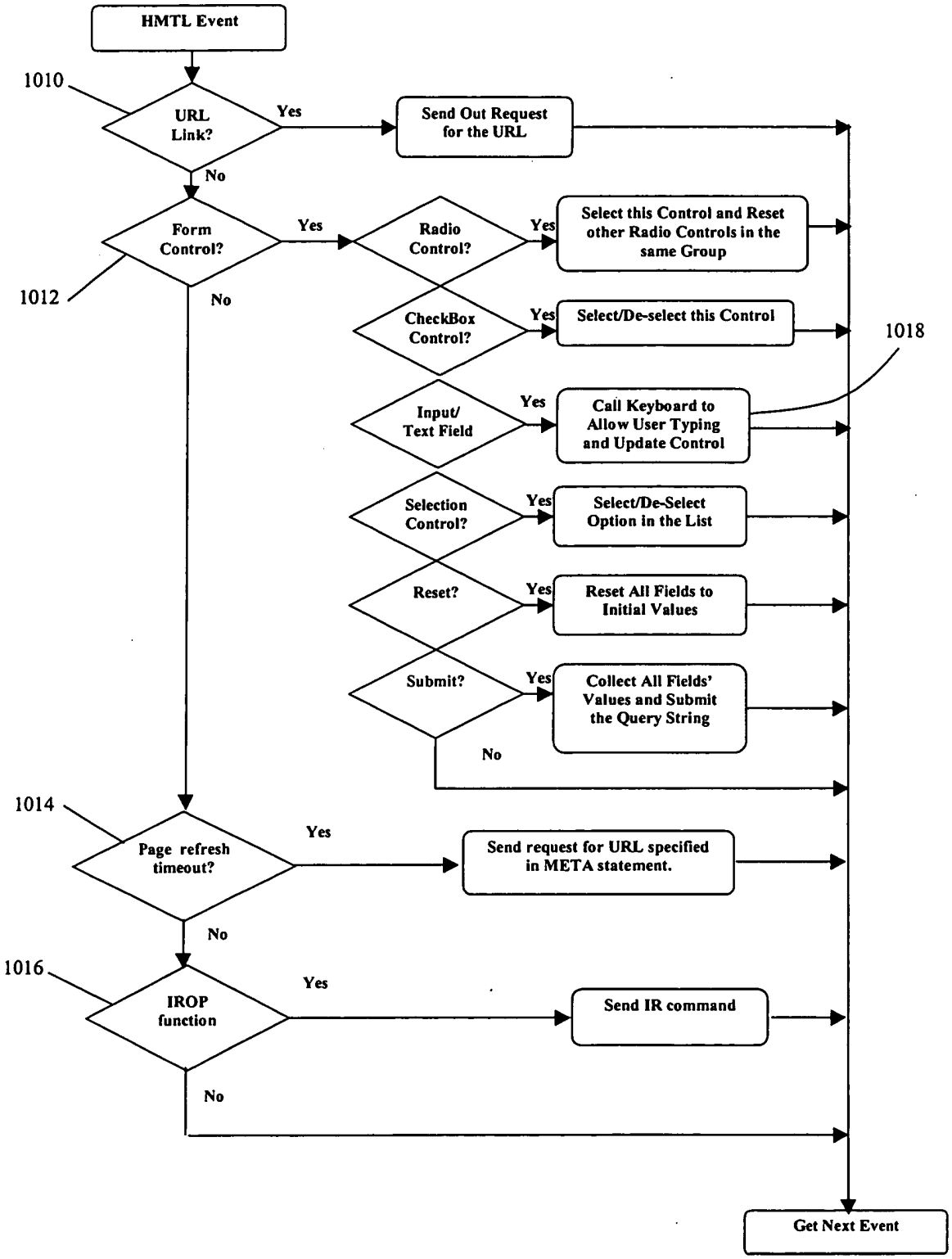

HMTL Event
1010
URL Link?
Yes
Send Out Request for the URL
No
Form Control?
Yes
Radio Control?
Yes
Select this Control and Reset other Radio Controls in the same Group
1012
No
CheckBox Control?
Yes
Select/De-select this Control
1018
Input/ Text Field
Yes
Call Keyboard to Allow User Typing and Update Control
Selection Control?
Yes
Select/De-Select Option in the List
Reset?
Yes
Reset All Fields to Initial Values
Submit?
Yes
Collect All Fields' Values and Submit the Query String
No
1014
Page refresh timeout?
Yes
Send request for URL specified in META statement.
No
1016
IROP function
Yes
Send IR command
No
Get Next Event

Figure 10d

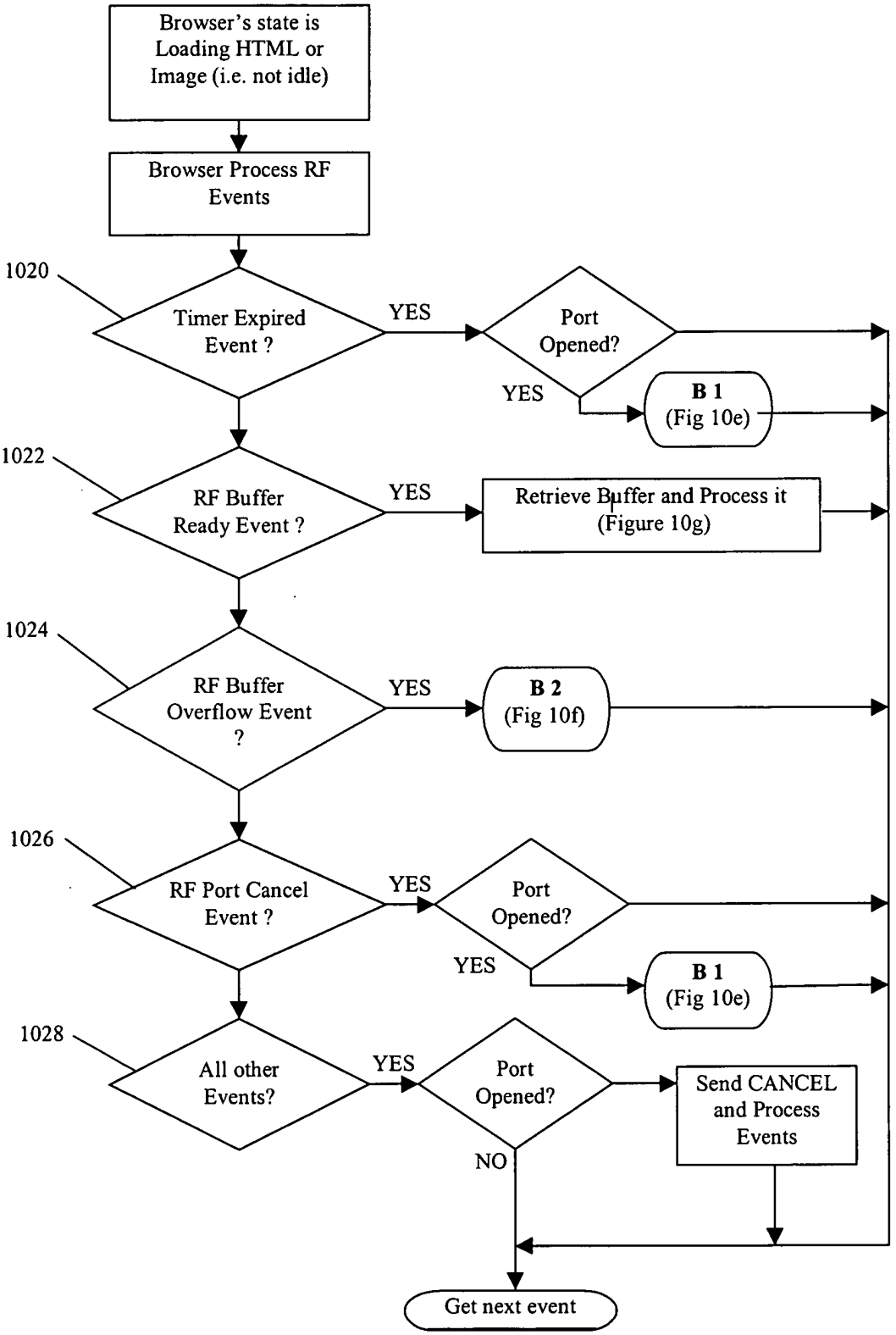

Browser's state is Loading HTML or Image (i.e. not idle)
Browser Process RF Events
1020
Timer Expired Event ?
YES
Port Opened?
YES
B 1 (Fig 10e)
1022
RF Buffer Ready Event ?
YES
Retrieve Buffer and Process it (Figure 10g)
1024
RF Buffer Overflow Event ?
YES
B 2 (Fig 10f)
1026
RF Port Cancel Event ?
YES
Port Opened?
YES
B 1 (Fig 10e)
1028
All other Events?
YES
Port Opened?
Send CANCEL and Process Events
NO
Get next event

Figure 10e

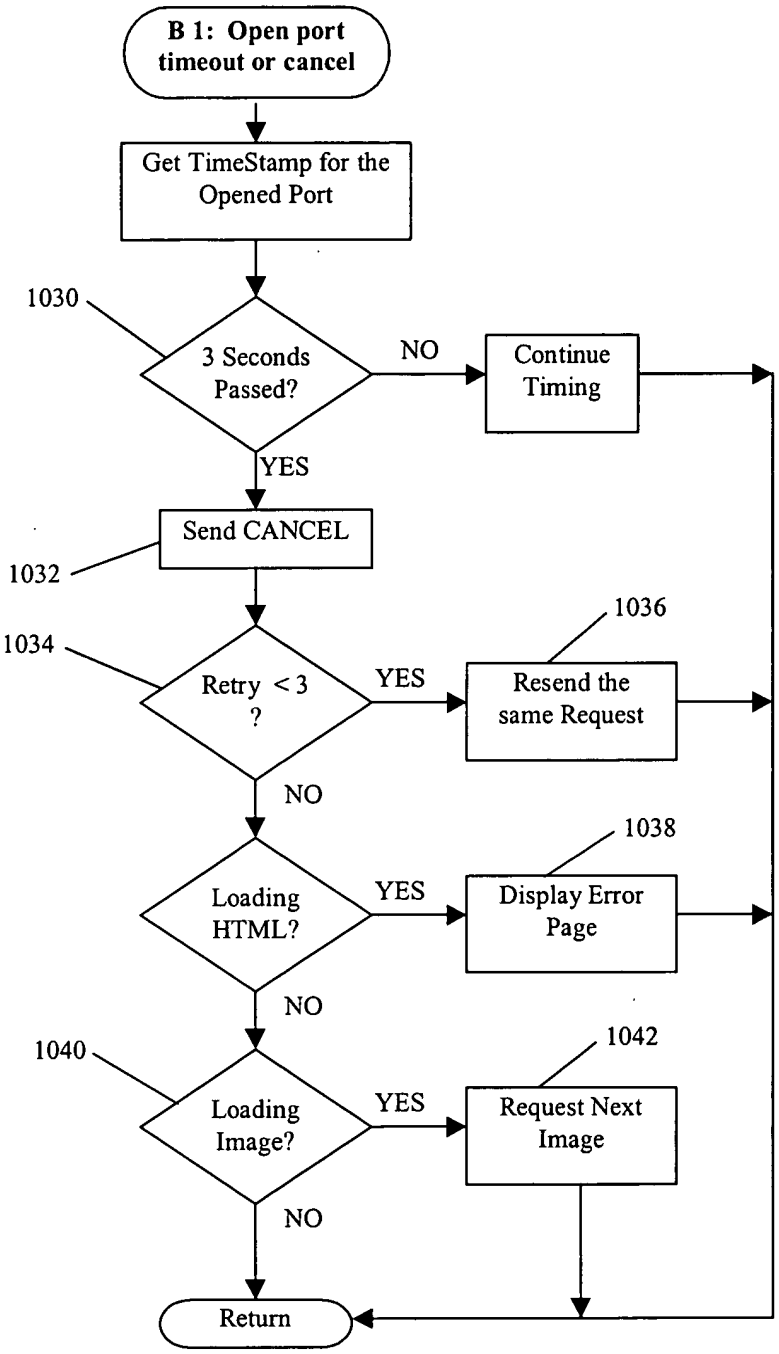

B 1: Open port timeout or cancel
Get TimeStamp for the Opened Port
1030
3 Seconds Passed?
NO
Continue Timing
YES
Send CANCEL
1032
1034
Retry < 3 ?
YES
1036
Resend the same Request
NO
Loading HTML?
YES
1038
Display Error Page
NO
1040
Loading Image?
YES
1042
Request Next Image
NO
Return

Figure 10f

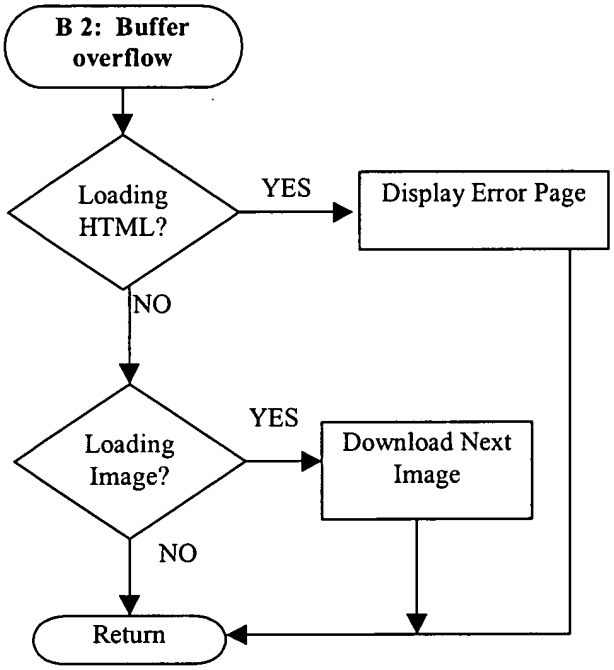
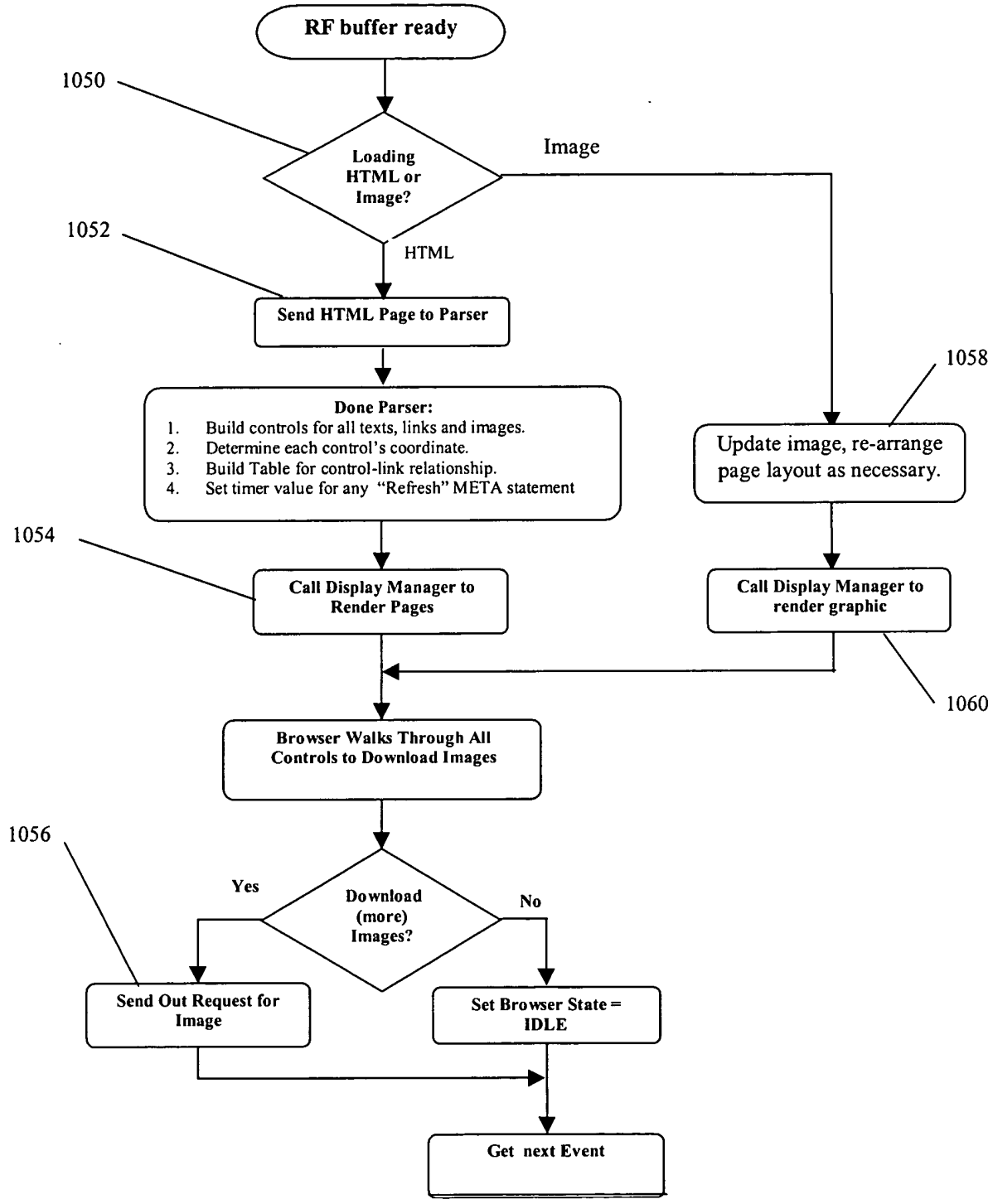

B 2: Buffer overflow
Loading HTML?
YES
Display Error Page
NO
Loading Image?
YES
Download Next Image
NO
Return

Figure 10g


RF buffer ready
1050
Loading HTML or Image?
Image
1052
HTML
Send HTML Page to Parser
1058
Done Parser:
1. Build controls for all texts, links and images.
2. Determine each control's coordinate.
3. Build Table for control-link relationship.
4. Set timer value for any "Refresh" META statement
Update image, re-arrange page layout as necessary.
1054
Call Display Manager to Render Pages
Call Display Manager to render graphic
1060
Browser Walks Through All Controls to Download Images
1056
Yes
Download (more) Images?
No
Send Out Request for Image
Set Browser State = IDLE
Get next Event

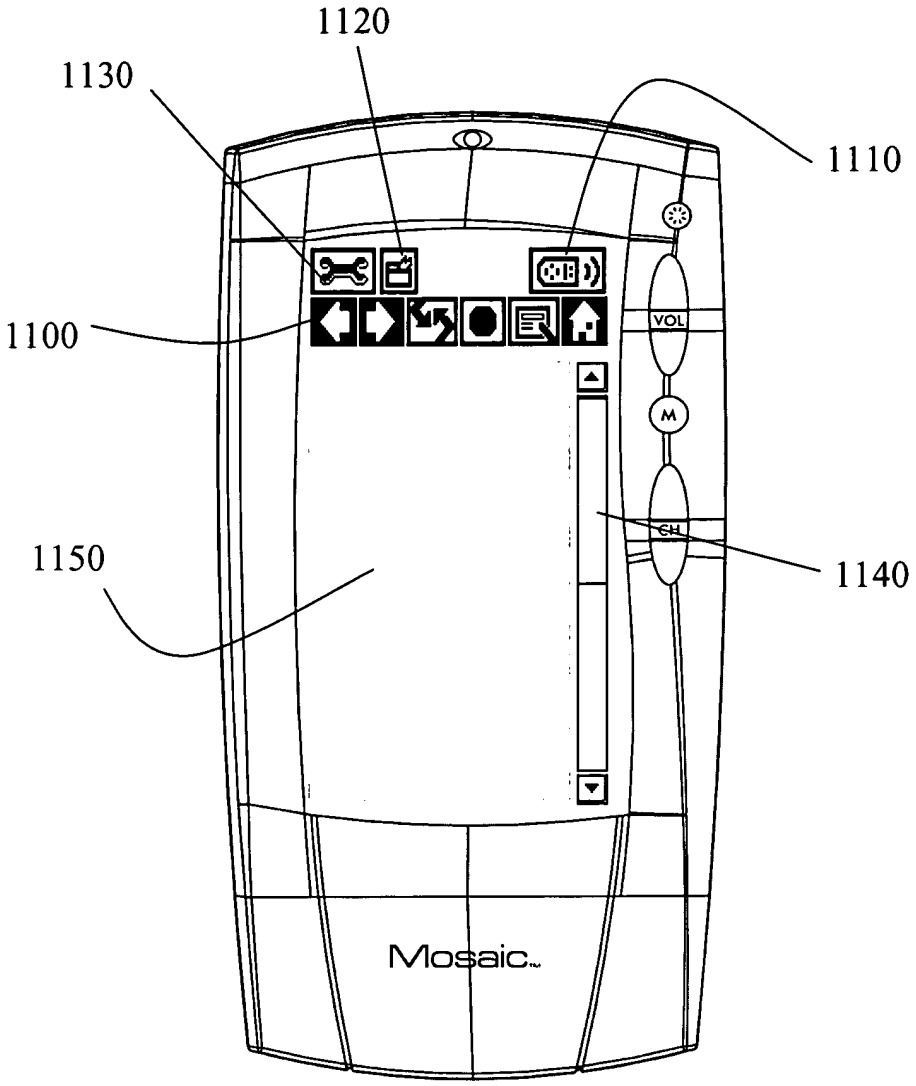
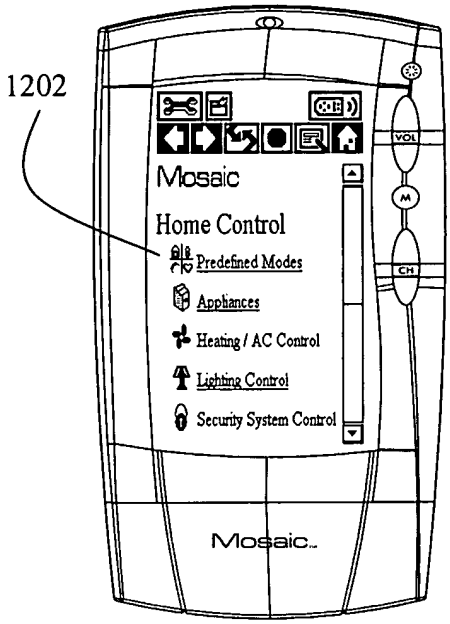


Figure 11

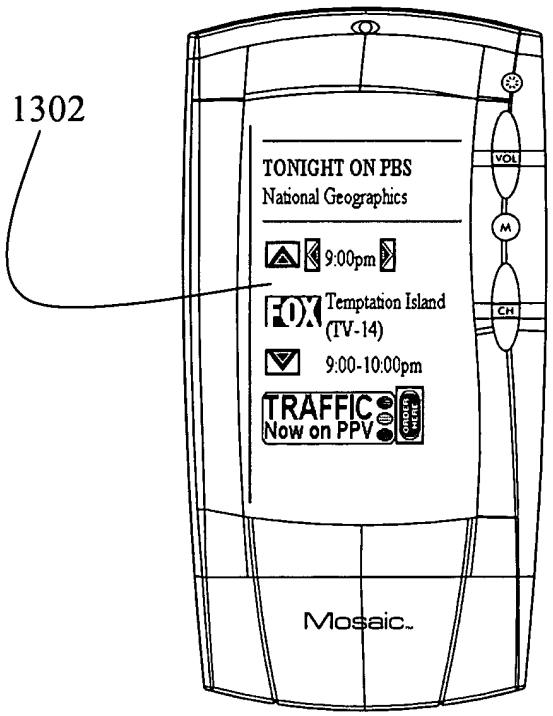
Express Mail No. EV339955760US




```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
<HTML><HEAD><TITLE>Home Manager</TITLE>
<META content="text/html; charset=windows-1252" http-equiv=Content-Type>
<META content="MSHTML 5.00.3207.2500" name=GENERATOR></HEAD>
<BODY leftMargin=0 link=#000000 text=#000000 topMargin=0 #000000?
marginheight="0" marginwidth="0"><A
href="index.htm"><IMG border=0 height=30
src="index_files/mosaic.gif" width=62></A> <BR><FONT
size=+2>Home Control</FONT>(tm)
<TABLE border=0 cellSpacing=1>
 <TBODY>
 <TR>
  <TD width=10>
  <TD><A href="modes.htm"><IMG border=0
   height=25 src="index_files/modesgif" width=25></A> </TD>
  <TD><A href="modes.htm">Predefined Modes</A>
  </TD></TR>
 <TR>
  <TD width=10>
  <TD><A href="appliances.htm"><IMG border=0
   height=25 src="index_files/Appliancesgif" width=25></A> </TD>
  <TD><A href="appliances.htm">Appliances</A>
  </TD></TR>
 <TR>
  <TD width=10>
  <TD><A href="hvac.htm"><IMG border=0
   height=25 src="index_files/hvacgif" width=25></A> </TD>
  <TD>Heating / AC
   Control</TD></TR>
 <TR>
  <TD width=10>
  <TD><A href="lighting.htm"><IMG border=0
   height=25 src="index_files/lighting.gif" width=25></A> </TD>
  <TD><A href="lighting.htm">Lighting
   Control</A> </TD></TR>
 <TR>
  <TD width=10>
  <TD><A href="security.htm"><IMG border=0
   height=25 src="index_files/Securitygif" width=25></A> </TD>
  <TD>Security System
   Control</TD></TR></TBODY></TABLE></BODY></HTML>
```

Figure 12

05/05/05 - 4005



1300

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
<HTML><HEAD><TITLE>Universal Electronics Inc.</TITLE>
<META content="text/html; charset=windows-1252" http-equiv=Content-Type>
<META name="Full Screen" content="Full_Screen">
<META content="MSHTML 5.00.3207.2500" name=GENERATOR></HEAD>
<BODY>
<hr>
    <b>TONIGHT ON PBS</b><br>
    National Geographics<hr>
    <table>
    <tr>
    <td>
    <a href="pbs.htm"><IMG alt="Up" src="up.gif" width=27 height=14></a>
    <td>
    <a href="fox8.htm"><IMG alt="left" src="left.gif" width=10 height=19></a>
    <td>9:00pm</td>
    <td>
    <a href="fox10.htm"><IMG alt="right" src="right.gif" width=10 height=19></a>
    </tr></table>
    <table>
    <tr><td>
    <IMG alt="fox" src="fox.gif" width=50 height=21>
    <td>Temptation Island<br>(TV-14)<br>
    </tr>
    <tr><td>
    <a href="abc.htm"><IMG alt="Down" src="down.gif" width=27 height=14></a>
    <td>9:00-10:00pm</tr>
    </table>
    <IMG alt="Traffic" src="traffic.gif"><a href="traffic.htm"><IMG alt="Order" src="orderhere.gif"></a>
</BODY></HTML>
```

Figure 13

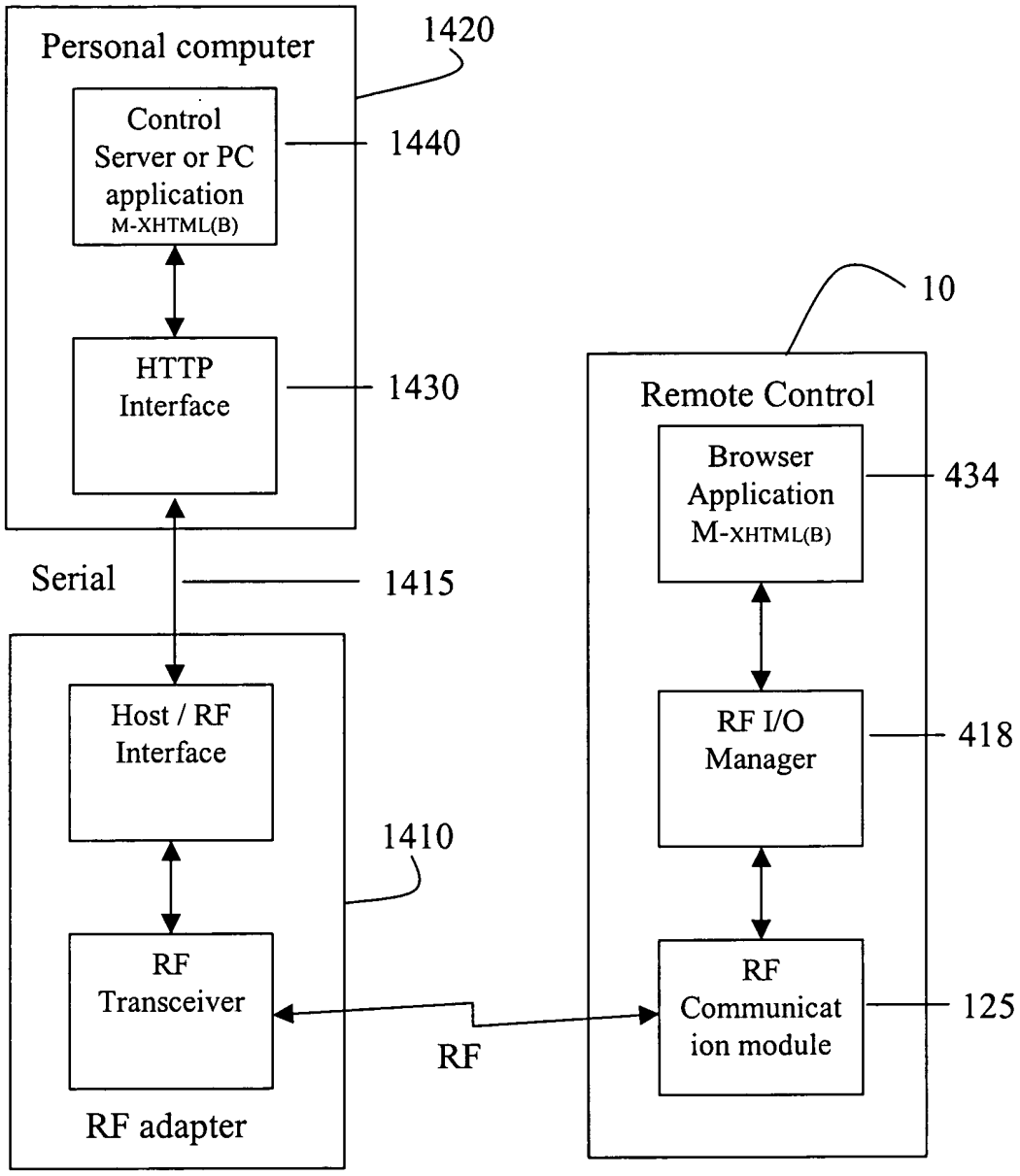

Personal computer
1420
Control Server or PC application M-XHTML(B)
1440
HTTP Interface
1430
Serial
1415
Host / RF Interface
1410
RF Transceiver
RF adapter
RF
10
Remote Control
Browser Application M-XHTML(B)
434
RF I/O Manager
418
RF Communicat ion module
125

Figure 14

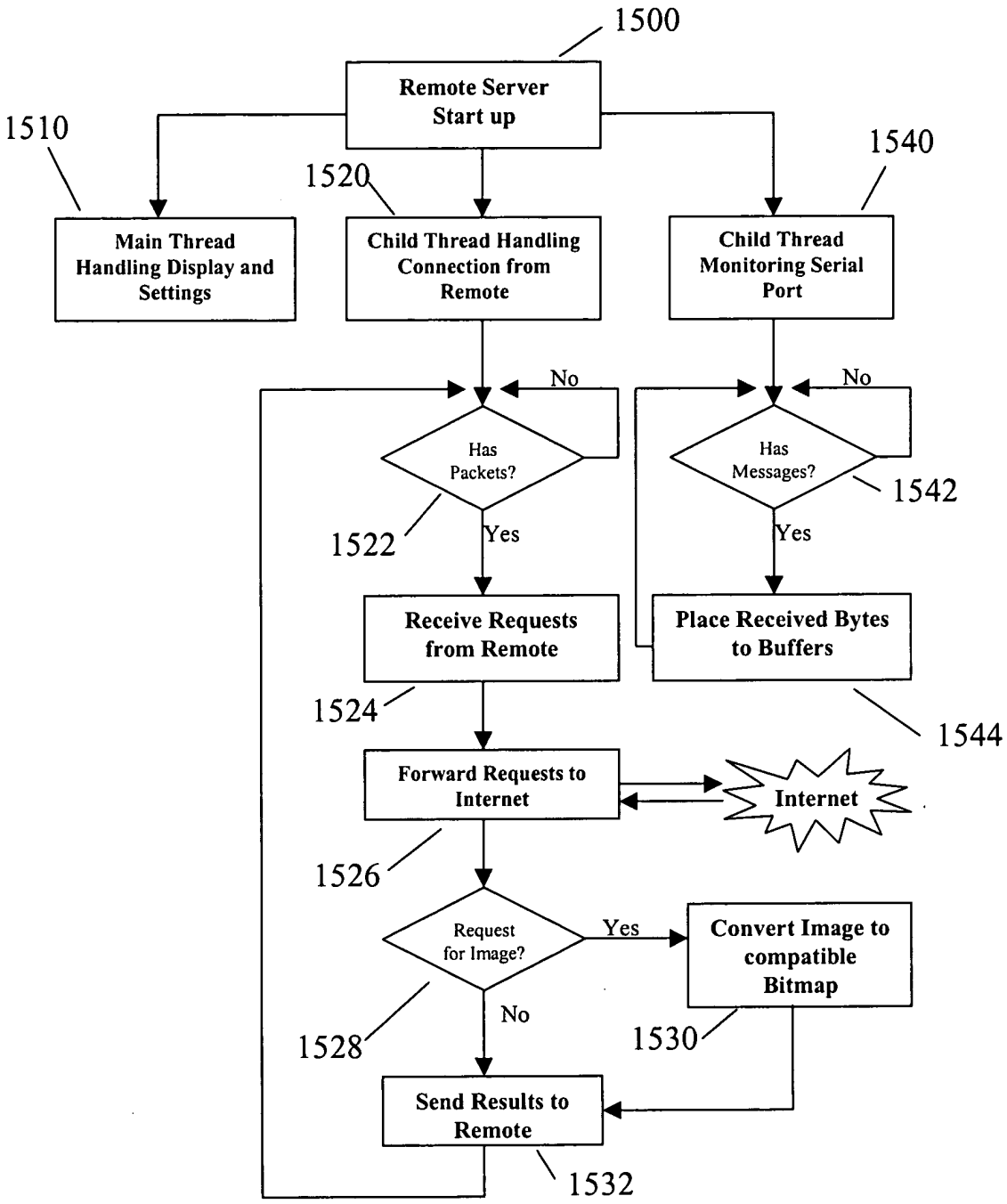

1500
Remote Server Start up
1510
1520
1540
Main Thread Handling Display and Settings
Child Thread Handling Connection from Remote
Child Thread Monitoring Serial Port
No
No
Has Packets?
Has Messages?
1542
1522
Yes
Yes
Receive Requests from Remote
Place Received Bytes to Buffers
1524
1544
Forward Requests to Internet
Internet
1526
Request for Image?
Yes
Convert Image to compatible Bitmap
No
1528
1530
Send Results to Remote
1532

Figure 15

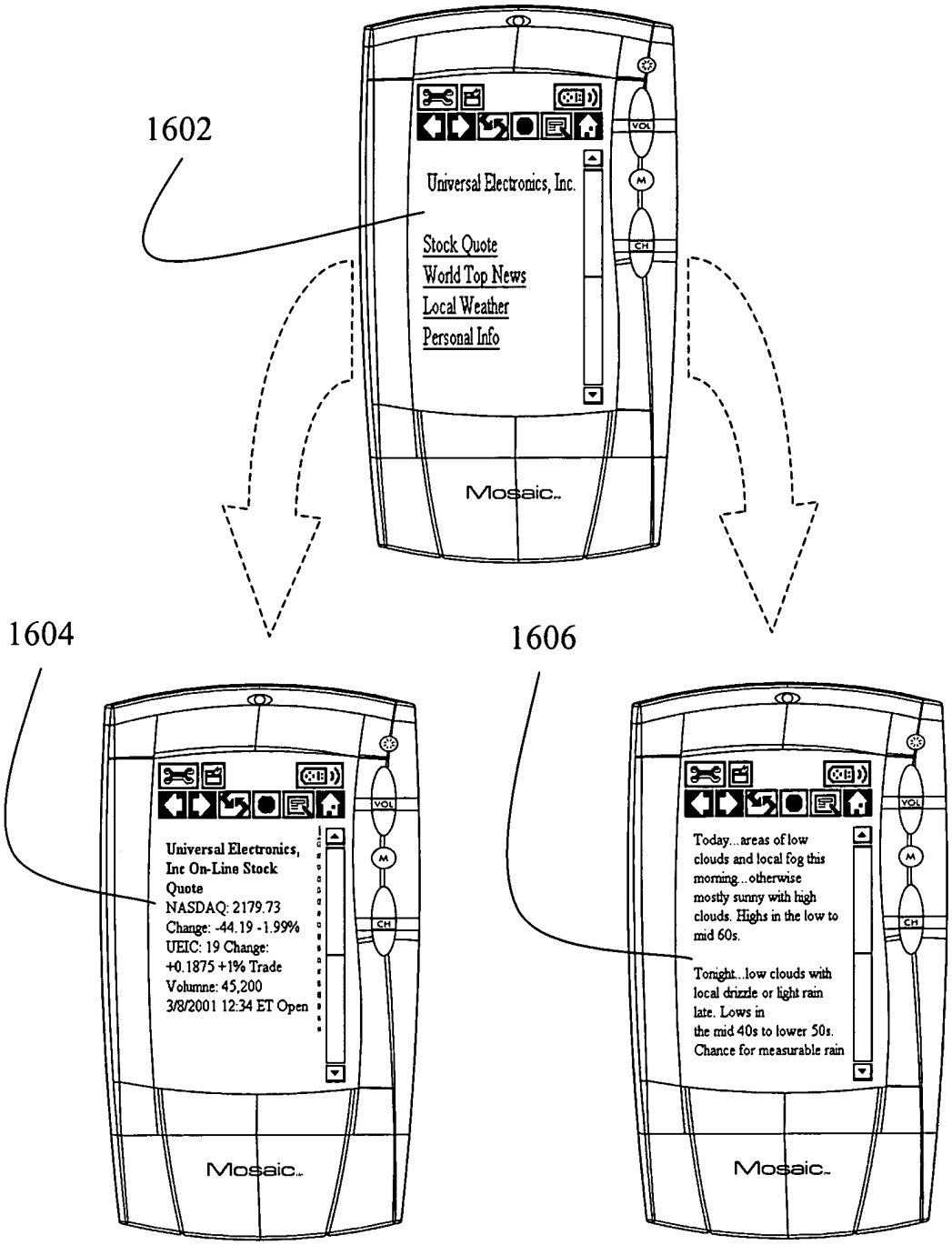

1602
Universal Electronics, Inc.
Stock Quote
World Top News
Local Weather
Personal Info
Mosaic
1604
Universal Electronics, Inc On-Line Stock Quote
NASDAQ: 2179.73
Change: -44.19 -1.99%
UEIC: 19 Change: +0.1875 +1% Trade Volumne: 45,200
3/8/2001 12:34 ET Open
Mosaic
1606
Today...areas of low clouds and local fog this morning...otherwise mostly sunny with high clouds. Highs in the low to mid 60s.
Tonight...low clouds with local drizzle or light rain late. Lows in the mid 40s to lower 50s. Chance for measurable rain
Mosaic

Figure 16

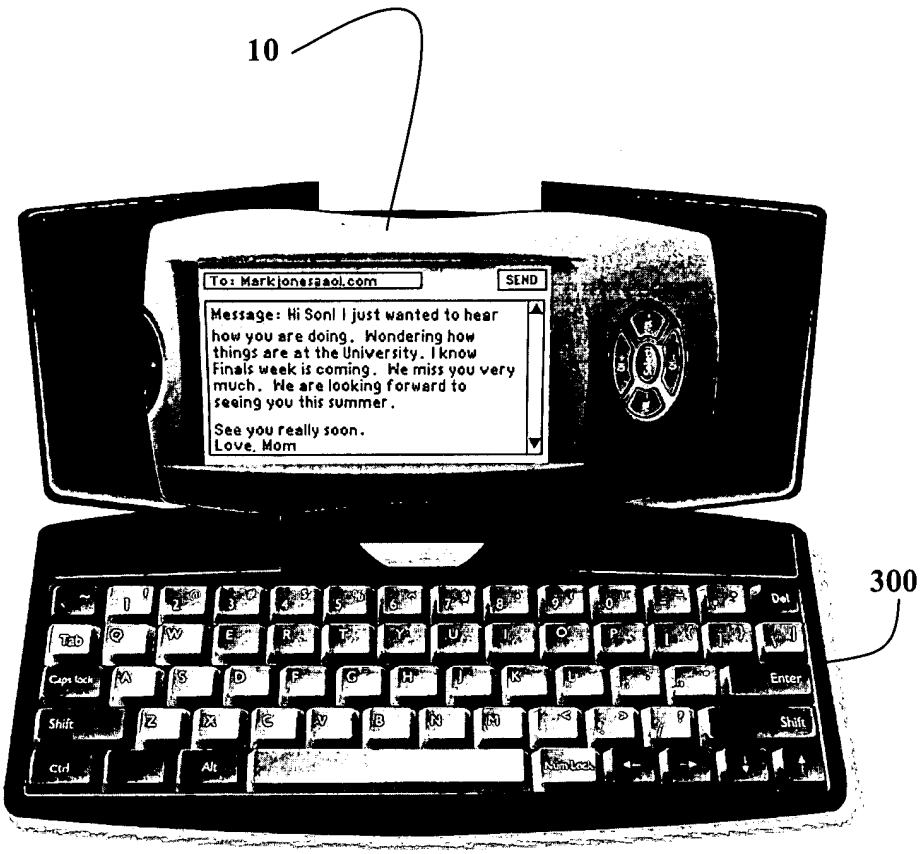

10
To: Markjones@aol.com
SEND
Message: Hi Son! I just wanted to hear how you are doing. Wondering how things are at the University. I know Finals week is coming. We miss you very much. We are looking forward to seeing you this summer.
See you really soon.
Love, Mom
300

Figure 17

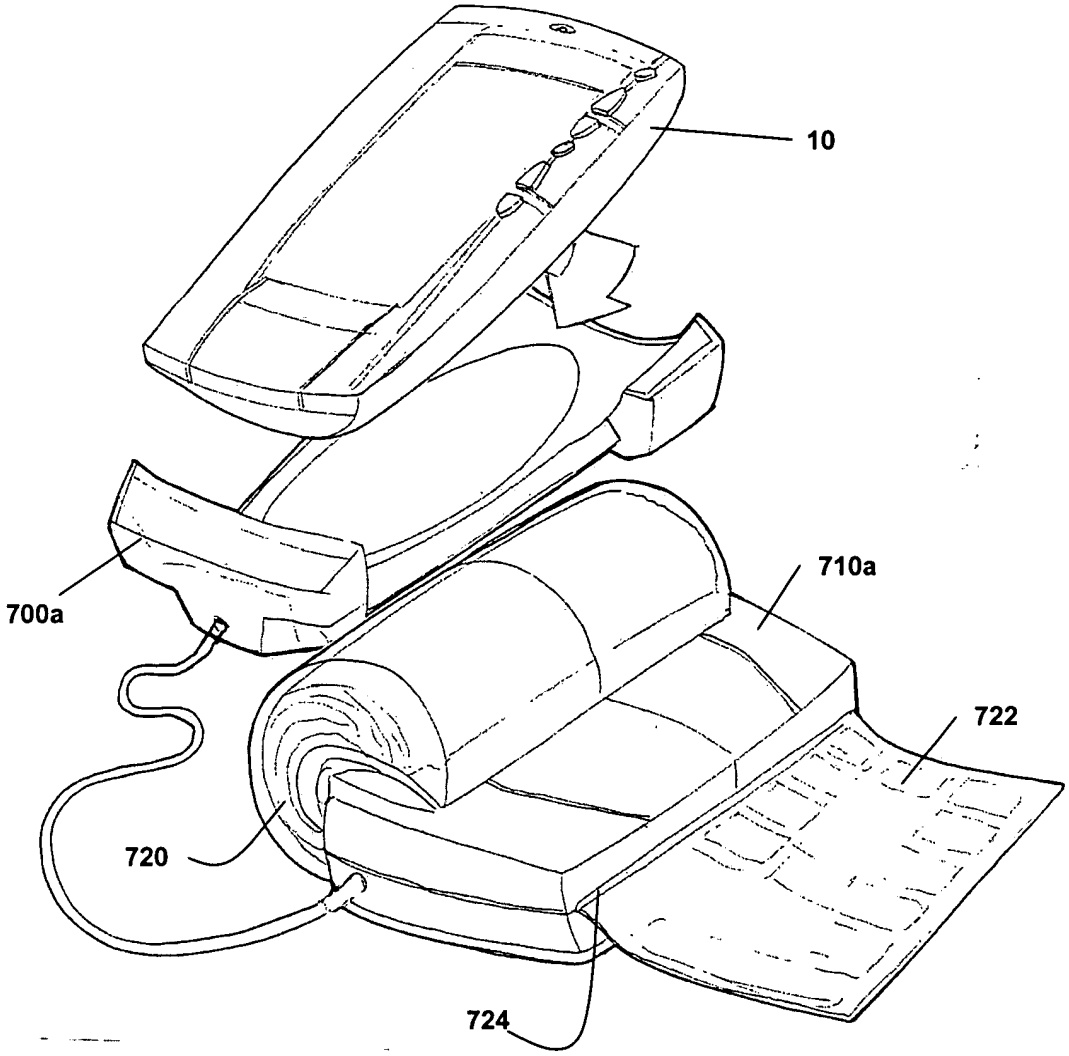


Figure 18

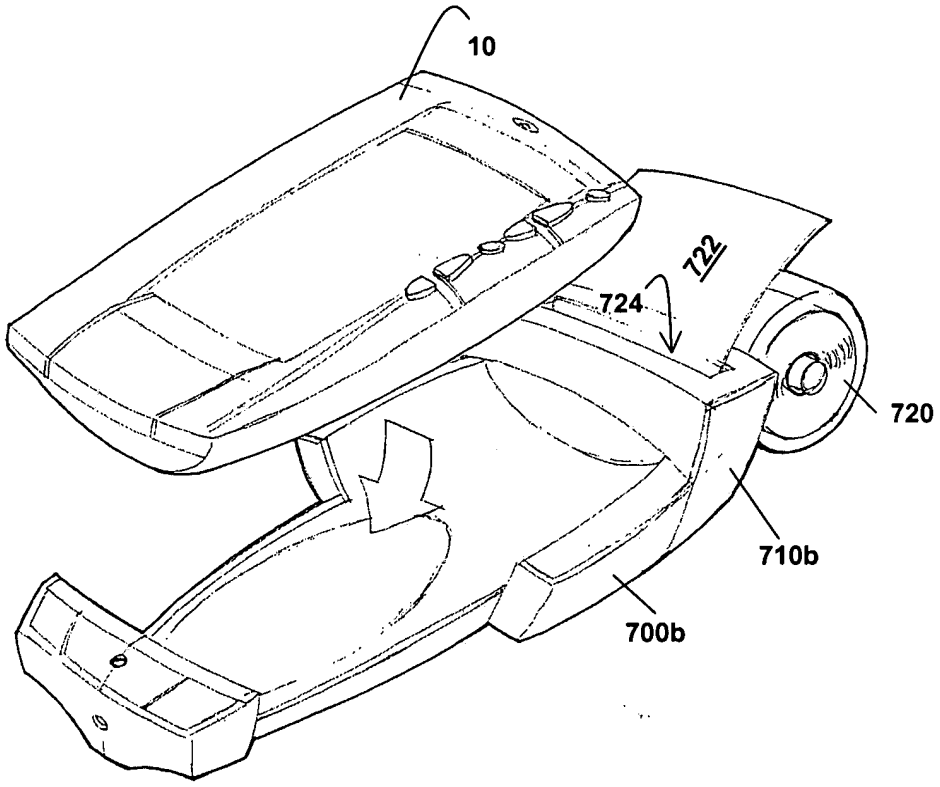


Figure 19

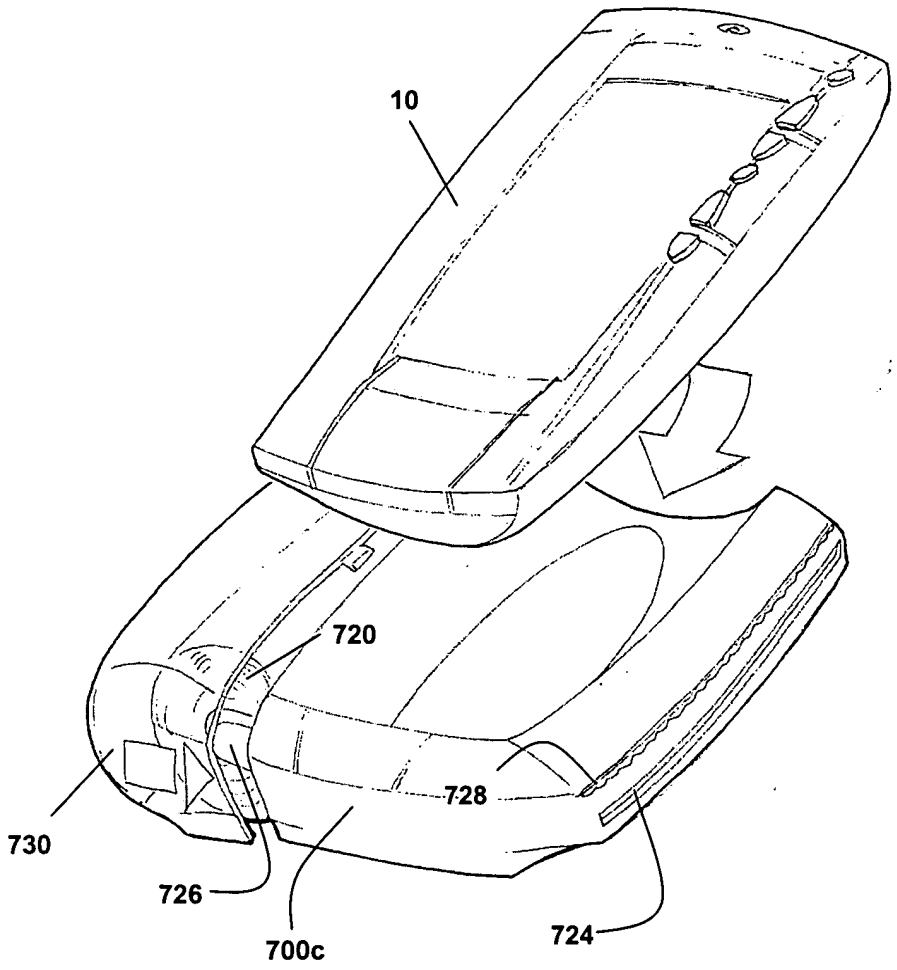


Figure 20

P05004-4565960

Figure 21

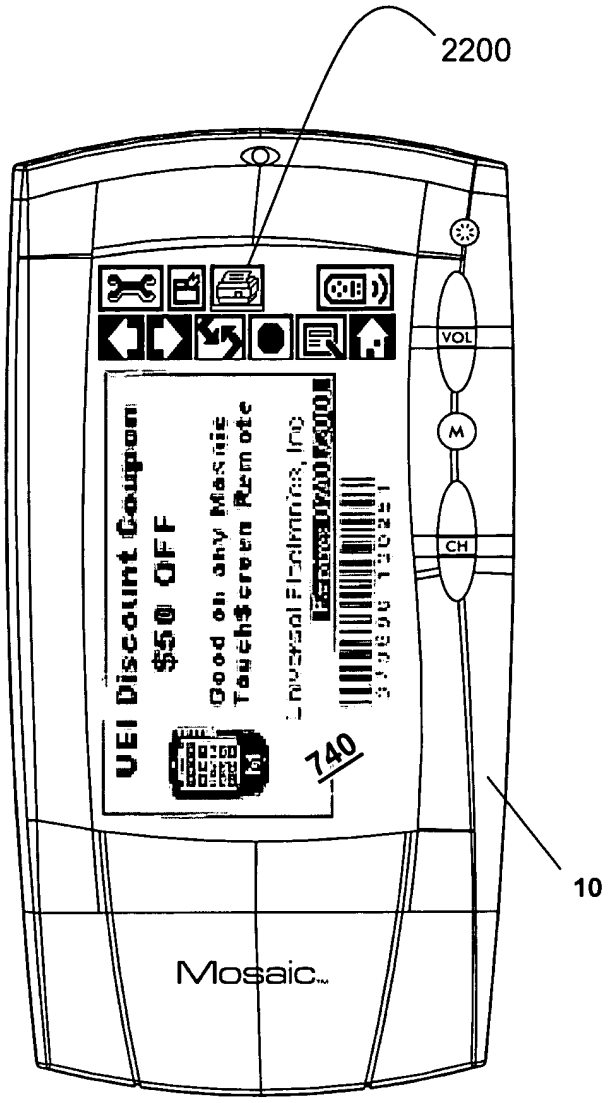
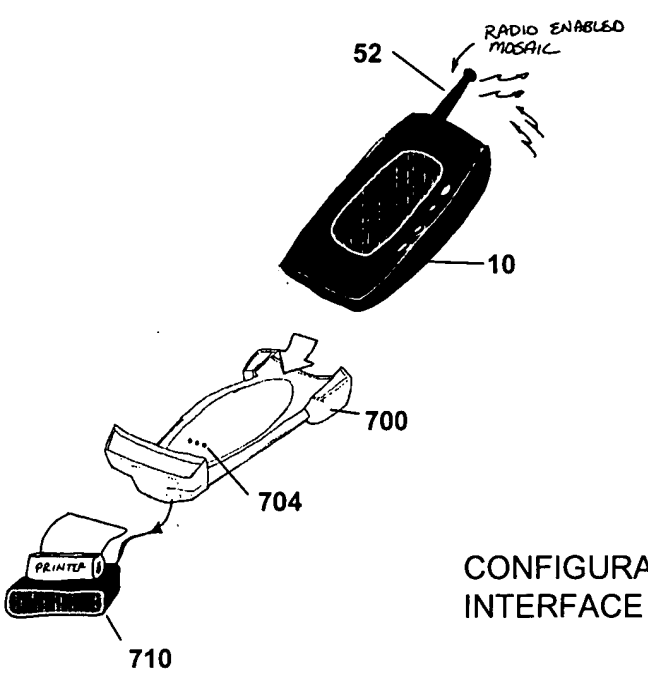
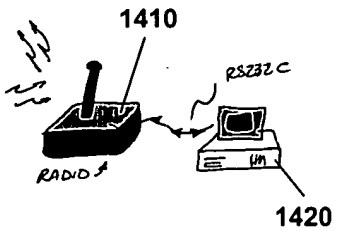
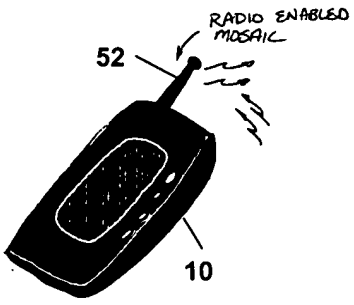

2200
VOL
M
CH
UEI Discount Coupon
$5@ OFF
Good on any Mosaic
Touch$creen Remote
740
10
Mosaic

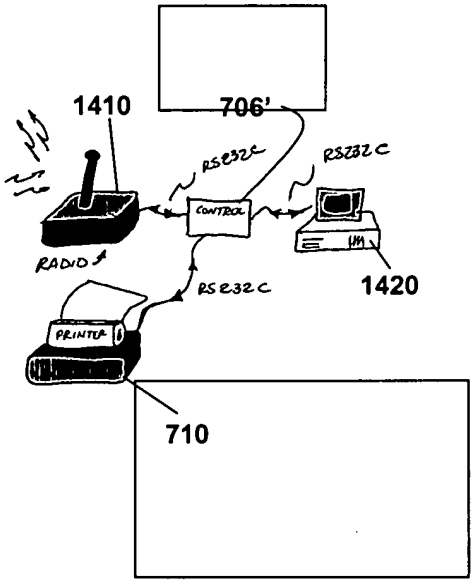
Figure 22





CONFIGURATION 1: PRINTER INTERFACE VIA CHARGING BASE





CONFIGURATION 2: PRINTER INTERFACE VIA RF BASE UNIT

FIGURE 23

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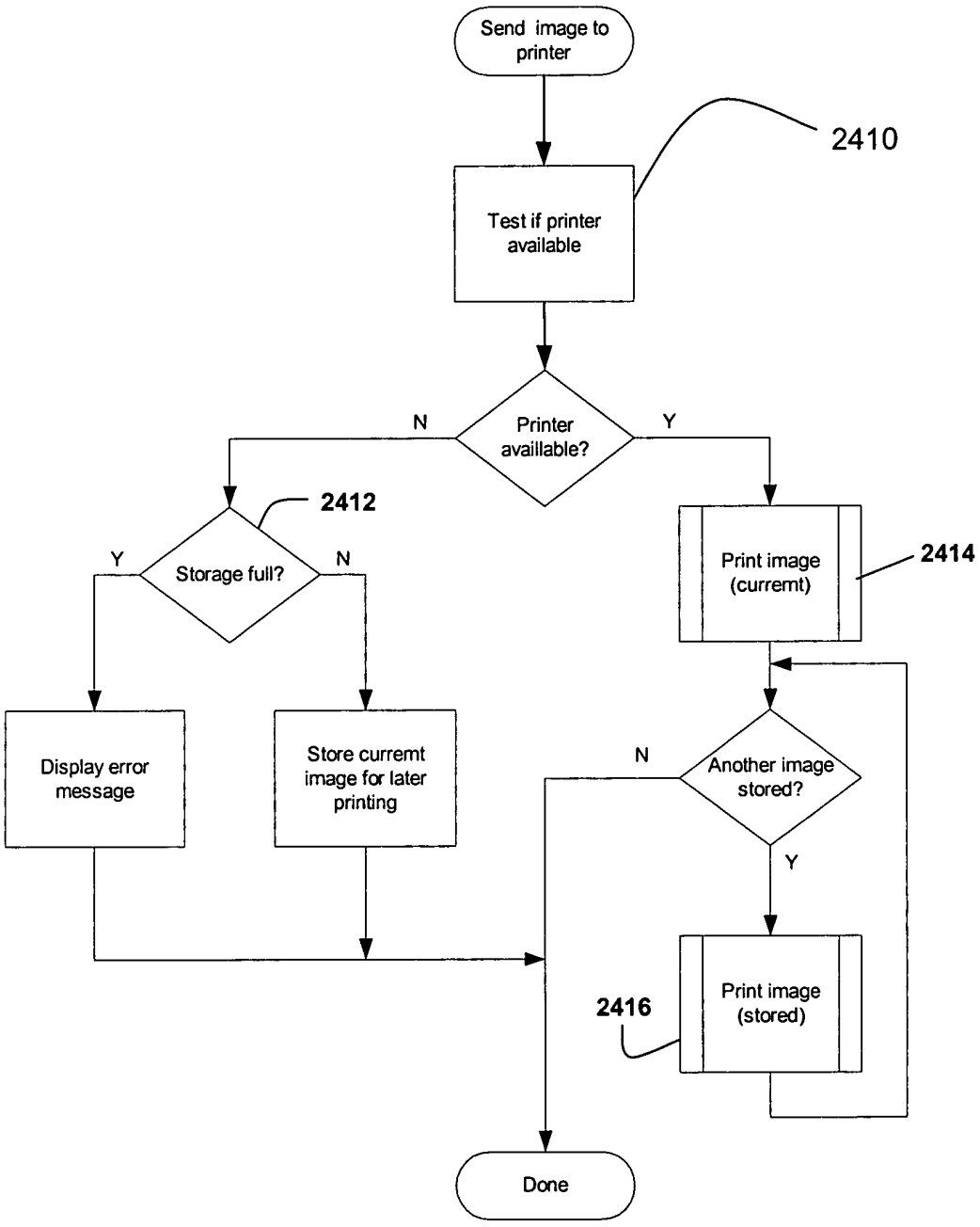
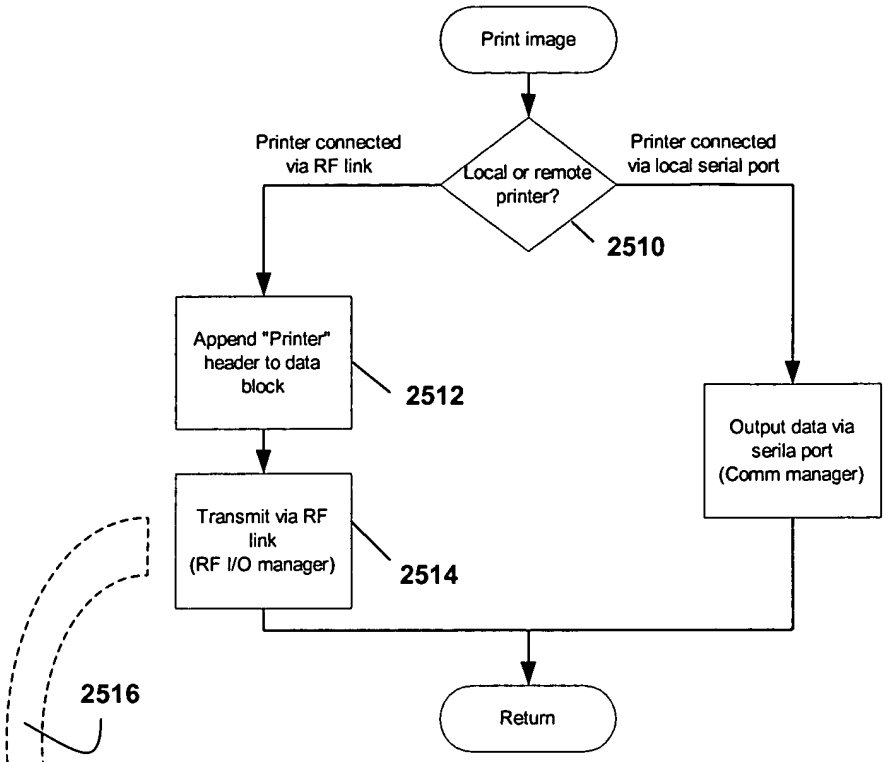

Send image to printer
2410
Test if printer available
Printer availlable?
N
Y
2412
Storage full?
Y
N
Display error message
Store curremt image for later printing
Print image (curremt)
2414
Another image stored?
N
Y
2416
Print image (stored)
Done

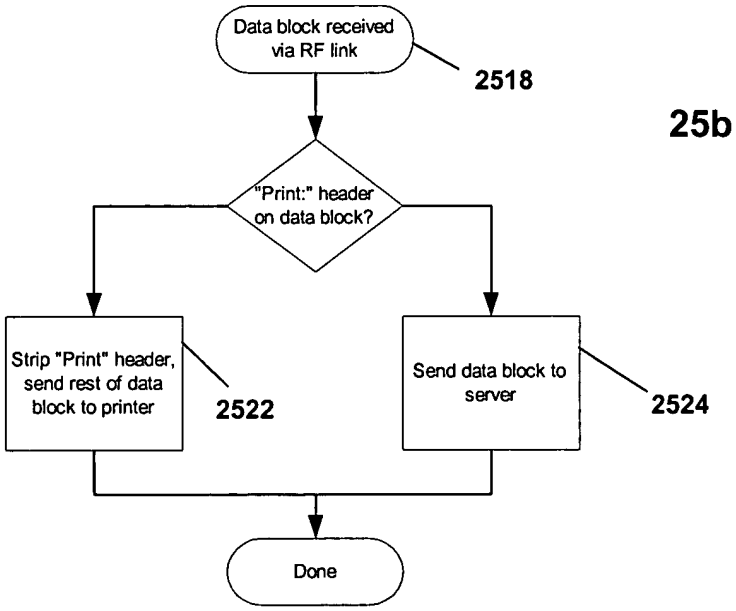
FIGURE 24

PCT/US2004/035050



25a

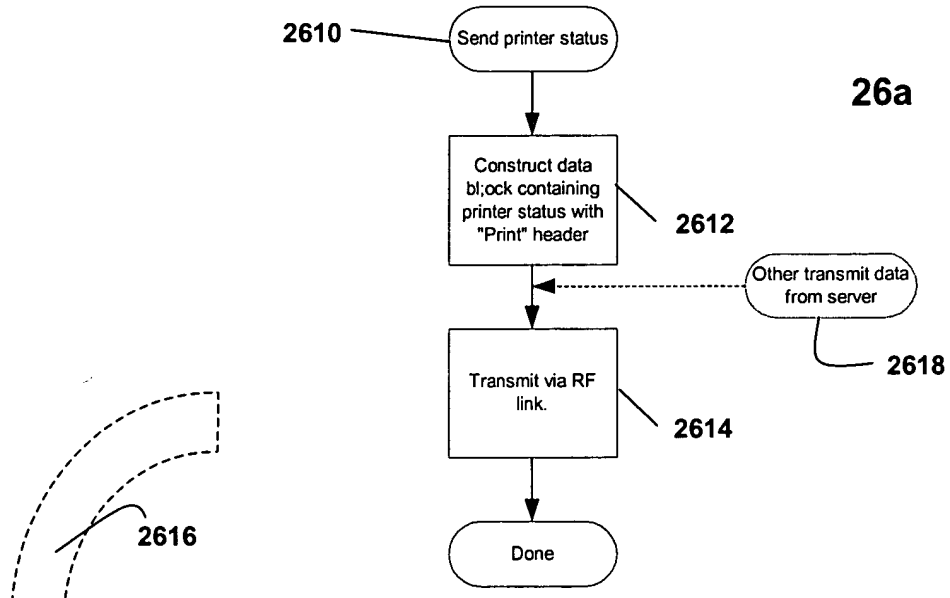
Printer output data routing in Remote Control



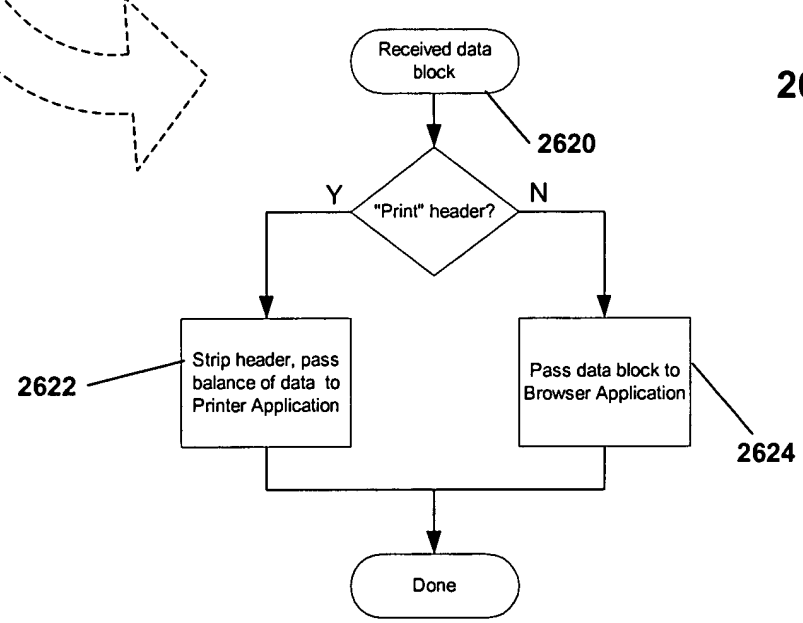
25b

Printer data routing in RF base station

FIGURE 25



Printer status message processing in RF base station



Printer status message routing in Remote Control.

FIGURE 26

Patent Pending